



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,661	02/18/2004	Fumitomo Matsuoka	249040US-2S DIV	1341
22850	7590	12/09/2004	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			ORTIZ, EDGARDO	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 12/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/779,661

Applicant(s)

MATSUOKA, FUMITOMO

Examiner

Edgardo Ortiz

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 February 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 14-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 14-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>2/18/04 &amp; 4/13/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 14-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Applicant's admitted prior art, as disclosed in figures 1-8 and described on pages 1-8 of the instant application. With regard to Claim 14, Applicant's admitted prior art discloses a semiconductor device comprising:

- a semiconductor substrate (101),
- a first impurity diffusion layer (109) formed in the semiconductor substrate;
- a second impurity diffusion layer (also 109) formed in the semiconductor substrate in a spaced-apart relation to the first impurity diffusion layer (see figure 2);
- a first insulating layer (108) formed on the first impurity diffusion layer;
- a second insulating layer (also 108) formed on the second impurity diffusion layer;
- a trench (112) formed over the semiconductor substrate in a manner to be defined between the first insulating layer and the second insulating layer (see figure 4);
- a gate insulating film (201) lined on a bottom surface and an inner sidewall surface of the trench (see figure 7); and
- a gate electrode (202) formed in the trench with the gate insulating film intervening therebetween, the gate electrode being formed in an overlapped relation relative to the first impurity diffusion layer and the second impurity diffusion layer (see figure 8).

With regard to Claim 15, Applicant's admitted prior art discloses a gate insulating film (201) that is formed of an insulating material having a dielectric constant of above 5 (see page 5, lines 8-16).

With regard to Claim 16, Applicant's admitted prior art discloses a gate insulating film (201) that contains one selected from the group consisting of Ta<sub>2</sub>O<sub>5</sub>, silicon nitride, Al<sub>2</sub>O<sub>3</sub>, BaSrTiO<sub>3</sub>, Zr oxide, Hf oxide, Sc oxide, Y oxide, and Ti oxide (see page 4, lines 10-22 and page 5, lines 8-14).

With regard to Claim 17, Applicant's admitted prior art discloses a first impurity diffusion layer (109) and the second impurity diffusion layer (also 109), each, comprise a third impurity diffusion layer (107) including a portion formed beneath the gate insulating film formed on the inner sidewall surface of the trench (112) and a fourth impurity diffusion layer (also 107) including a portion formed beneath any of the first insulating layer (108) and second insulating layer (also 108) and having a deeper junction in the semiconductor substrate than the third impurity diffusion layer (see page 2, lines 22-24 and figure 2).

With regard to Claim 18, Applicant's admitted prior art discloses a metal silicide layer (110) formed on the first impurity diffusion layer (109) and the second impurity diffusion layer (also 109) at those areas beneath the first insulating layer (108) and the second insulating layer (also 108), (see page 2, line 27 and page 3, lines 1-5).

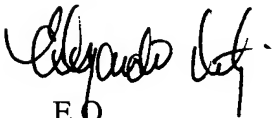
Art Unit: 2815

***Conclusion***

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edgardo Ortiz whose telephone number is 571-272-1735. The examiner can normally be reached on Monday-Friday (1st Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 571-272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



E.O.

A.U. 2815

12/2/04